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AND

SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

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SUBJECT MATTER INDEX OF APPLICATIONS FOR PATENTS.

March 21st to April 20th inclusive.

The following Index gives first the class, then the name of the Inventor, and No. of the application. In this list (com.) means Invention communicated from abroad. Further information as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur Street, Charing-cross.

ACIDS.—C. T. Wordsworth and J. Wolstenholme, 1429. E. A. Brydges (com.), 1665. F. C. Glaser (com.), 1725. W. Weldon (com.), 1752.

ADVERTISING, Advertisements.—C. W. Morley, 1886.

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AIR, Gases, and Vapours (Pumping, Forcing, Exhausting. Compressing, &c.)—W. Teague, 1387. E. Edwards (com.), 1441.

ALKALIES (Soda, Potash, Lithia, Ammonia.)—W. Young and G. T. Beilby, 1377. P. Spence, 1494. J. B. Spence and A. Watt, 1630. L. Mond, 1683. W. Weldon (com.), 1753.

ARMOUR Plates, &c.—H. Reusch, 1409.

AXLES, Shafts, Bearings, Journals, Axle Boxes, &c.—J. H. Johnson (com.), 1637. A. Riche, 1645. W. R. Lake (com.), 1790.

BAGS, Portmanteaus, Sacks, Holders, Satchels, Reticules, Knapsacks, Valises, &c.—T. A. Mitchell, 1653. A. Budenberg and A. Timpe, 1805.

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BATHS, Bathing Appliances, Lavatories, &c.—T. Maccall, 1497. W. P. Thompson (com.), 1739. W, H- Luther, 1770.

BELLS, Gongs, Ringing Bells, &c.—H. Binko (com.), 1583.

BELTS, Braces, Garters, Girths and Bands for Wear.—C. D. Abel (com.), 1800.

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BLOWING Engines, Fans, Bellows, &c.—A. Browne (com.), 1897.

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BOOTS, Shoes, Leggings, Clogs, Cleaning Boots, Boot-jacks, &c.—H. H. Lake (com.), 1398. W. R. Lake (com.), 1424. J. W. Saunders, 1495. J. W. Pritchett, 1531. J. and G. J. Taylor, 1572.. W. R. Lake (com.), 1708. J. Wetter (com.), 1798.

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BOTTLES, Bottle-stoppers, Capsules, Bottling and Decanting Liquids, Stopping and Opening Bottles, &c.—W. J. Holrord, 1406. H. Barrett, 1438. H. H. Lake (com.), 1450. D. Rylands, 1486. C. Chesnought, 1543. W. von Schlieffen, 1569, H. J. West, 1597. J. J. Varley, 1741. W. Brierley (com.), 1843.

BOXES, Cases, Bins, Chests, Trunks, &c.—A. H. Lowe, 1355. J. Hirst, 1535. J. W. and A. Lawrence, 1537. F. Wirth (com.), 1617. T. A. Mitchell, 1653. A. Millar, 1676. D. Nicoll, 1688. M. J. Verkouteren (com.), 1698. E. Richardson, 1791.

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CASKS and Barrels, Cask-stands, Vent-pegs, Tilting Casks &c.—W. Watts, 1376. F. Robinson, 1513. B. Fowell, W. Clancy and J. C. Walker, 1889,

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COATING, Covering, Plating, Sheathing, Gilding, Bronzing, &c.—W. H. Walenn, 1639.

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CYLINDERS and Rollers, Covering Cylinders and Rollers.—J. Lewthwaite, 1433. A. Riche, 1645. W. A. Barlow (com.), 1832. W. P. Thompson (com,), 1877, A. J. Bonlt (com.), 1891.

DIES, &c.—J. Noad, 1628.

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DISINFECTING, Deodorising, Fumigating Apparatus and Compositions, &c.—G. J. Andrews and F. H. Parker, 1396. W. R. Lake (com.), 1578. C. Scott, 1604. M. Vinning, 1644. E. and R. Jacobsen, 1711.

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DRINKING VESSELS, Tumblers, Cups, Saucers, Goblets, &c.—J. Tams, 1564.

DRAMATIC and Theatrical Performances.—A. H. Lowe, 1355.

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Lead (salts and oxides).—E. A. Cowper and T. Sopwith, 1625. F. Maxwell Lyte, 1721.

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Ovens and Kilns.—J. Cropper, 1778.

Packing Pistons, &c.—W. V. Ley, 1471. W. R, Lake (com.), 1499. A. A. Rickaby, 1785. J. Bell and R. H. Harper, 1838.

Packing Goods, &c.—A. H. Lows, 1355. D. Nicoll, 1688.

Paints, Colours, Varnishes, &c.—M. Menge and H. Krause, 1589.

Paper Pasteboard, Papier Mache, Paper Hangings.—W. Springer, 1445. G. Tidcombe, 1514. A. C. Henderson (com.), 1775. W. Conquest (com.), 1883.

Patterns, Designs, Models, &c.—J. Baier, 1371.

Pens, Penholders, Pencils, Pencil Cases, &c.—W. Morgan Brown (com.), 1772. W. R. Lake (com.), 1733. H. J. Haddan (com.), 1871.

Photography and Photographic Apparatus.—M. O. Hund, 1573. G. L. Addenbrooke, 1621.

Pipes, Tubes, and Syphons: Joining Pipes.—J. A. Freake and T. McCormick, 1469. D. Walker and W. S. Simpson, 1493. W. R. Lake (com.), 1499. S. Walker, 1577. A. J. Boult (com.), 1649. G. Lohf, 1723. S. Fox, 1766. S. Fox, 1777. T. Pullin and H. Bonser, 1819. W. T. Whiteman (com.), 1845.

Pistons, &c.—A. A. Rickaby, 1735. G. W. von Nawrocki (com.), 1825. J. Bell and R. H. Harper 1838.

Plants &c.—J. Parker, 1686.

Preserving Food, &c.—J. Ross, 1542. J. Hood, 1546. E. Kunkler, 1567. W. McDonnell 1660. W. Keates, 1809. H. H. Doty, 1842. E. G. Brewer (com.), 1852.

Presses, Compressing, &c.—J. Tilley and F. Morris, 1743.

Printing and Transferring: Type and other Surfaces for Printing, Composing, and Distributing Type.—F. Rath (com.), 1393. T. Smith 1431. J. Noad, 1628. J. F. Haskins, 1847. W. R. Lake (com.), 1849. W. R. Lake (com.), 1865. W. R. Lake (com.), 1876. W. Conquest, 1883.

Propelling Machinery, Transmitting Power and Motion, Converting Movements.—F. Asthower and T. Bicheroux, 1365. H. Clegg, 1633. W. Deighton, 1844. A. M. Clark (com.), 1864. P. Pfleiderer (com.), 1886. M. R. Pryor, 1893.

Pulleys.—G. W. Beynon, 1414. H. Clegg, 1633.

Pumps, Pumping and Forcing Liquids, Pumping and Raising Water and other Liquids, Pumps, Pistons, and Packing.—B. J. B. Mills (com.), 1380. C. T. Wordsworth and J. Wolstenholm, 1429. G. M. Cruikshank (com.), 1454. A. Browne, 1897.

Railway and other Buffers.—R. Jahns, 1763.

Railways, Carriages, Coupling, Uncoupling, and Altering Positions of Carriage and Engines.—A. Riche, 1645. J. P. Davies, 1681. T. J. Handford (com.), 1862.

Railway, Permanent Way, Rail Joints, Chairs and Sleepers, Portable Railways, Atmospheric Railways, Switches, Points, Crossings, and Turn-tables.—A. Riche, 1362. H. Bridgewater, 1373. W. J. Boaler, 1519. F. Jenkin, 1830. T. J. Handford (com.), 1862.

Reaping and Mowing, &c.—B. Samuelson and W. G. Manwaring (com.), 1477.

Refrigerating and Freezing, Cooling Liquids Making Ices, &c.—R. Pictet, 1420. C. D. Young, 1460. J. J. Coleman, 1506. W. Keates, 1809. W. Nightingale, 1834.

Registering, &c.—J. B. Rogers, 1390. J. Armstrong, 1443. H. Lyon, 1562, J. Lawson and J. Sirech, 1664. W. M. Llewellin, 1693. P. Mara and J. Winsom, 1758.

Roads, Paths, &c.—J. Wheeler, 1652.

Rods and Bars.—F. Kingston, 1890.

Ropes, &c.—J. G. Hay, 1528. T. W. Cordna (com.), 1540. J. Rowbottom, 1559.

Samples, Specimens, &c.—M. J. Verkonteren, (com.), 1628.

Scents and Perfumes, Scent Bottles, &c.—W. R. Lake (com.), 1578.

Screens.—M. J. Hund, 1573.

Screws, Screw Drivers, &c.—W. R. Lake (com.), 1552.

Sewing and Embroidering.—J. H. Johnson (com.), 1502. T. Wheelhouse, 1658. J. Glasier and A. Briggs, 1776.

Shields, &c.—A. S. Leighs, 1806.

Ships and Boats, &c.—H. Reusch, 1409. A. Pengelley and R. Day, 1425. J. H. Johnson (com.), 1638. E. G. Robertson, 1704. W. R. Lake (com.), 1786. E. Hoskins, 1882.

Shot, Shell, Bullets, Cartridges, Percussion Caps, &c.—W. Naylor, 1518. J. Vavasseur, 1592. E. Palliser, 1703.

Sifting, Sorting, and Separating, &c.—B. Tillett (com.), 1627.

Signals, &c.—J, Formby, 1385, H, Morris, 1527. H. J. Haddan (com.), 1606, J. Harison, 1682. J. Cran, 1714. E. Tyer, 1726, L. A. Groth (com.), 1814.

Sizing, &c.—A. J, Boult (com.), 1501.

Soap, &c.—L. Varicas, 1479. B. J. Young, 1728.

Soundings, &c.—L. A. Groth (com.), 1814.

Spindles and Flyers.—R. Sykes, 1411. W. Holms, 1810.

Spinning and Preparing for Spinning.—J, M. Howson, 1370, F. Ripley and T. Brigg, 1419. J. Wain, 1446. A. M. Clark (com.), 1602. W. Cliff, 1610. W. Holms, 1810.

Spray Producers.—W. R. Lake (com.), 1578. W, P. Thompson, (com.), 1739.

Springs.—R. Jahns, 1763.

Stamps (Revenue), &c.—J. Hirst 1535.

Starch, &c.—H. H. Lake (com.), 1591.

Stays, &c.—H. Knight, 1434.

Steam (Supplying) &c.—W. T. Whiteman, 1845.

Steam and other Boilers, Cleaning and Preventing Incrustation of Boilers, Water Feeding Apparatus for Boilers.—J. Imray, 1402. J. Pam, 1650. G. Stevenson, 1666. R. H. Brandon (com), 1745. J. Imray (com.), 1837. J. Fox, 1869.

Steam Engines (Stationary, Locomotive, and Marine.)—T. English, 1427. W. R. Lake (com.), 1474. G. Mather, 1539. W. R. Lake (com.), 1790. H. G. and W. Woodbridge, 1804. W. A. Barlow (com), 1832.

Steam Traps—J. Shaw, 1892.

Steering and Guiding.—J. E. Commerrell, 14[illegible]5. T. Britton, 1709.

Stone, &c.—W. Walker, 1836.

Stuffing Boxes and Glands, &c.—W. Ley, 1471.

Sugar and Syrups, Glucose.—J. H. Johnson, (com.), 1478. W. R. Lake (com.) 1848.

Sulphur.—T. B. Raiwes, 1493.

Surgery, &c.—F. Kingston, 1408.

Tablecovers, &c.—J. Lewthwaite, 1435.

Telegraphs; Telegraph Printing Apparatus.—J. H. Johnson (com.),, 1555. W. R. Lake (com.), 1574. F. D. Gould, 1663. R. Smillie, 1850. C. Curtoys, 1851. W. J. Burnside, 1853.

Thermometers, Barometers, Pyrometers, &c.—J. Formby, 1385.

Thrashing Machines, Reaping Machines—C. Green, 1442. A. W. Mantle, 1653.

Tickets, Labels, &c.—J. Parker, 1686.

Tilling and Cultivating, &c.—R. J. and H. Wilder, 1508. M. Pryor, 1893.

Tobacco and Snuff, Cigars, Cigar-Holders, Pipe and Cigar-lighters, Smoking Pipes, Tobacco Pouches, &c.—W. Boggett, 1449. A. G. Goodes, 1451. E. Large, 1500. W. Rest, 1691. E. Richardson, 1791.

Torpedoes, &c.—W. Hutchinson, 1668.

Tramways, &c.—J. P. Davies, 1681. T. J. Handford (com.), 1862.

Traps for Animals, &c.—E. A. Brydges (com.), 1813.

Tunnels, &c.—C. D. Abel (com.), 1624.

Turning, Lathes, &c.—J. M. Alling (com.), 1452. C. Griffith, 1687.

Umbrellas, Parasols, &c.—J. Willis, 1418. J. Miniere, 1422. W. Grant (com.), 1840.

Valves, Taps, Stop Cocks, Plugs; Regulating the Flow and Pressure of Fluids.—C. Fisher, 1382. W. Teaque, 1387. W. Jones and J. McLeod, 1426, H. J. West, 1597. T. G. Fleury, 1613. B. and H. Walker, 1715.

Velocipedes.—J. Lucas, 1395. J. Jenner, 1581. A. E. Gorse, 1623. T. Forshaw, 1667. W. Scantlebury, 1680. G. Rixon, 1764. J. White, 1793. W. R. Morgan, 1872.. S. Collier, 1839. H. A. Newton (com.), 1859. A. H. Griffiths, 1885.

Ventilation, &c.—T. Rowan, 1785. A. W. Reddie (com.), 1792.

Walking-Sticks, &c.—J. Hickison, 1509.

Washing, &c.—R. E. Wearden, 1482. W. H. Beck, 1789.

Water-Closets, &c.—H. Conolly, 1655.

Water-Power Engines, &c.—E. Davies, 1615. R. Scott, 1659. T. C. Bontet, 1801.

Wearing Apparel, &c.—G. and S. Mandleberg and H. Rothband, 1578.

Weaving, Braiding, Plaiting, Preparing for Weaving, &c.—J. Shorrock, 935. J. Stansfield, 1374. J. Green, 1383. A. Rollason, 1418. L. A. Groth (com.), 1457. E. H. Wade, 1473. J. and J. Hodgkinson, 1488. J. Rouse, 1520. T. Blackhurst, 1736.

Weighing, &c.—C. Reuther, 1608.

Wheels for Carriages, &c.—J. Taylor, 1634.

Wheels for Machinery, &c.—G. W. Blynon, 1414.

Window Blinds and Sashes.—A. Smith, 1828.

Wire, Wire Working, &c.—J. Westgarth, 1762. J. C. Mewburn (com.) 1821.

⁂ *The above List is prepared from the Patent Records by Mr. T. Morgan, Secretary of the Inventors' Patentright Association, Limited.*

A mechanical *musical instrument* has been patented by Mr. Azro Fowler, of New York city. This invention relates to wind musical instruments that are operated manually by keys, or are played or controlled by means of one or more sheets or strips of paper or other suitable material perforated to represent the different notes or sounds it is desired to produce, and caused to automatically pass over air ducts, which, according as they are opened by the perforations in the paper, cause the reeds or other sounding devices to be played as desired; and the invention has special reference to the pneumatic action of the instrument.

Reviews.

VIBRATORY MOTION AND SOUND.

"Vibratory Motion and Sound." By J. D. Everett, M.A., D.C.L., F.R.S., F.R.S.E., Professor of Natural Philosophy in the Queen's College, Belfast. London: Longman, Green, and Co.

The present treatise is stated to be intended to open up the subject of Vibratory Motion to students who have mastered the elements of dynamics.

The key to the whole subject is Simple Harmonic motion, to which accordingly a large amount of space has been devoted. Its definition and leading properties are discussed in Chapter I.

Chapter III. discusses the composition of two Simple Harmonic motions of the same period, and contains some novelties in the shape of simple geometric proofs of propositions usually established by trigonometry (see especially Sections 24-28). Chapter II. has cleared the way by some explanations regarding the general subject of composition of motions.

These first three chapters lead straight to the geometry of Simple Harmonic waves, which is accordingly discussed in Chapter IV. The proofs of some of the most important properties of waves are given in duplicate, first by general reasoning, and then by differentiating the equation of a wave. This chapter is based on Chapter I., and in like manner Chapter V., which treats of the composition of two systems of Simple Harmonic waves of equal wave-length, is based on Chapter III. Stationary undulation is shown (by proof in duplicate, as above) to be the resultant of two opposite systems of waves, and the production of beats by waves in the same direction is also explained.

Chapter VI. discusses the general subject of the composition of two Simple Harmonic motions, and gives the mathematics of Lissajous' curves, with accounts of some methods of tracing them.

Chapter VII. breaks the monotony of a continuous thread of mathematical deduction by describing some very interesting mechanical illustrations of Simple Harmonic motion, including Sir William Thomson's tide-predictor and Donkin's harmonograph. A novel method of combining two motions by a jointed parallelogram, which has been described in Chapter II., is here applied to the composition of two opposite circular motions.

Chapters VIII. and IX. discuss in a popular way the propagation and reflection of sonorous undulations.

Chapter X. and XI. contain accurate investigations (some of them novel) of the rapidity of stationary vibrations of strings and columns of air, the velocity of propagation of sound along a column of air, and the energy of sonorous undulations.

The last two Chapters, XII. and XIII., may be regarded as a musical appendix, the former being devoted to simple and compound tones, and the latter to musical intervals.

The author remarks that the work is mainly addressed to students at a particular stage of advancement, and it is hoped that the line of treatment adopted will render it attractive to the general mathematical reader.

As far as we are concerned, we cordially agree with Professor Everett's remarks, and specially commend this work to those who wish to acquire knowledge on this subject.

Colburn's New Monthly Magazine for March, 1882, sustains its vitality as newly impressed upon it, amongst its articles being "The Kingdom of Peace," by Frederick Willmer; "The Bretby Bells" (poetry), by Guy Roslyn; "Our Lodge in the Wilderness," by Rosa Mackenzie Kettle; "A Motley Sky" (poetry), by Fay Axtens; "The

Prologue and Epilogue in English Literature," by G. S. Bower; "Prince Carl," by the author of "Miss Molly;" "Great Companies and Trading Firms," which are notices of large industrial works.

LITERARY ANNOUNCEMENTS. — A new work, entitled "The Hall Marking of Jewellery Practically Considered," by George E. Gee, author of the Goldsmith's Handbook," "The Silversmith's Handbook," &c., is announced for immediate publication by Messrs. Crosby Lockwood and Co., London. The work will include an account of the Assay Towns of the United Kingdom, the Stamps at present employed, and will deal fully with the Laws relating to the Standards and the Marks at all the existing Assay Offices, &c., &c. The same publishers also announce the following as just ready for publication: a new and enlarged edition of "The Manual of Colours and Dye Wares:" their Properties, Applications, Valuation, Impurities, and Sophistications, revised and enlarged by the author, Mr. J. W. Slater; a handy little waistcoat-pocket volume for Mechanics, Engineers, Builders, &c., entitled "Tables, Memoranda, and Calculated Results," selected and arranged in a compact form by Francis Smith. Messrs. Crosby Lockwood and Co. will also issue immediately the following technical works in their popular "Weale's Rudimentary Series:" "The Construction of Roofs of. Wood and Iron," deduced chiefly from the Works of Robison, Tredgold, and Humber, by E. Wyndham Tarn, M.A.; "Elementary Decoration, a Guide to the Simpler Forms of Everyday Art as applied to the Interior and Exterior Decoration of Dwelling Houses, by J. W. Facey, jun.; and "A Practical Treatise on Handrailing, showing New and Simple Methods for finding the Pitch of the Plank, &c., by George Collings.

MR. DARWIN.

ON Wednesday, the 19th ult., in the afternoon, in his seventy-fourth year, died the eminent naturalist Charles Darwin, having been born on February 12th, 1809, at Shrewsbury, his father being Dr. Robert Waring Darwin, F.R.S., and his grandfather Dr. Erasmus Darwin, F.R.S., the author of "Zoonomia," "The Botanic Garden," and other works. On his mother's side he was the grandson of Josiah Wedgwood.

He went to Edinburgh University in 1825, and studied there for two years. He read, when under sixteen years of age, two short papers on natural history subjects before the Plinian Society at the close of 1826. From Edinburgh he went to Christ's College, Cambridge, and took his degree in 1831. In December, 1831, he sailed in the Beagle with Capt. Fitzroy for his memorable voyage round the world of nearly five years' duration, the Beagle reaching England again in October, 1836. He married in 1839, and has lived as a country gentleman at Down, near Beckenham, in Kent.

From a memoir in the *Athenæum*, from which we quote, the first paper published by him after his return from his voyage appears to have been one on the habits of the South American ostrich, which was read at a meeting of the Zoological Society in March, 1839, when Mr. Gould, in describing the new species of South American ostrich, which he named *Rhea Darwinii* in honour of its discoverer, already spoke of the important accessions to science resulting from Mr. Darwin's exertions and of his liberality in presenting his collection to the Society. Little did Mr. Gould dream of the real importance to mankind of the effects of that voyage. We know from the introduction to the "Origin of Species" that it was during the voyage, probably in 1834, that the young naturalist, twenty-five years old, being "much struck with certain facts in the distribution of the organic beings inhabiting South America, and in the geological relations of the present to the past inhabitants of that continent," conceived that "by patiently accumulating and reflecting on all sorts of facts that could possibly have any bearing on the matter," some light might be thrown on the origin of species. How he laboured, steadily collecting and pondering over evidence for twenty-three years after his return before publishing his grand result, is a matter of history. His process was the same in all his scientific investigations; his patience was inexhaustible. In his late fascinating work on vegetable mould and earthworms he describes one experiment in which a layer of chalk was laid on a patch of ground in 1842 and the result quietly waited for till 1871. He continued from 1837 onwards working out the results of his investigations during the voyage, and published several papers on geological subjects in the *Proceedings* of the Geological Society, most of which were embodied in his "Geological Observations on South America," and his work "On the Volcanic Islands of the Atlantic and Pacific Oceans." His famous treatise "On the Structure and Distribution of Coral Reefs," alone sufficient to gain for him a most distinguished reputation as a geologist, was published in 1842. In 1844 we find him publishing two papers on comparative anatomy which must have waited their turn since the voyage in his portfolio, one on the land planarian worms of South America, and the other on Sagitta and its development. His "Journal of Researches," which made his name familiar wherever the English language is read, the most engrossing of all his works, and one on which he especially prided himself, was published in 1845. He had previously edited in 1840, and provided with an introduction and numerous notes, the scientific work on the zoology of the voyage of H.M.S. Beagle. In 1851 he published the first part of the monograph on the Cirripedia, a most masterly treatise, and a perfect model of what a systematic zoological treatise should be. In the same year he issued a monograph on fossil Lepadidæ, and in 1854 the second part of his monograph on the Cirripedia, and a monograph on fossil Balanidæ and Verrucidæ. This systematic work must have stood him in good stead in assisting the development of the great problem of his life, by affording extended practical experience of the exact values of specific and generic distinctions, and the difficulties attending the manufacture of genera and species by the systematist. By this monograph his reputation as a zoologist was securely established. In 1853 he received the Royal Medal of the Royal Society. He was thus full of honours and distinction, with a reputation as a man of science of the highest order, before the great work of his life, the "Origin of Species," appeared in 1859, and gave him at once a world-wide celebrity amongst all educated persons. It is amusing now to look back on the ridicule and contempt with which his theory was met in many quarters at first, and to follow the gradual change wrought in public opinion as time has gone on. An interesting view of the process might be gathered from a study of the reviews of his successive books in the *Times* newspaper. *Punch* made fun of his theory, and it was vehemently preached against. Even at Down, whilst he was addressing the whole educated world, the country parson used to refute him weekly to the rustic congregation. Now this is past, the clergy are satisfied, and there remains no naturalist of reputation who does not at least accept his views, scarcely any who are not enthusiastically endeavouring to extend them and strengthen their position. After the publication of the "Origin of Species," Mr. Darwin's time was mostly employed in issuing the material which had been collected by him as evidence to be used in maturing his theory, worked up into masterly treatises dealing in detail with the several branches of it. To this category are to be referred his "Variation of Plants and Animals under Domestication," his "Development of Man and Selection in relation to Sex," his "Expression of the Emotions in Man and Animals," and his "Fertilisation of Orchids."

He is as distinguished as a botanist as he is as a zoologist and geologist. He early published a series of essays on the various arrangements in flowers to ensure cross-fertilization, on dimorphism in flowers, on the movements of climbing plants, &c. The last named essay was expanded into a volume and republished as a work on "The Movements and Habits of Climbing Plants." His work on carnivorous plants is familiar to all. Although in the later period of his life he mainly devoted his attention to the researches the results of which are embodied in the works just mentioned and some others, he followed most assiduously the progress of biology in all its branches, and especially in those matters which he had himself made objects of research. Thus we find him in 187[illegible] writing a long letter to *Nature* on the males of cirripeds, *à propos* of the discovery by the late Sir Wyville Thomson of minute males adhering to a large Scalpellum dredged by H.M.S. Challenger from a great depth; and his last published writing was a letter to *Nature* containing some facts relating to the means of transport of bivalve mollusca. The appearance of his letters from time to time in *Nature* was a matter of great interest. A most striking feature about all his works is that the evidence produced is so thorough and the result so important and complete. It would appear as if every new idea which came into his head was sure to be successful, and to lead to a startling discovery on test of experiment; but for the encouragement of less less gifted searchers it may be stated that such was not the case. He had at least some disappointments, and failed to work out to his satisfaction more than one problem which he attempted; but he was so full of brilliant ideas, and worked so hard and steadily, with so perfect a judgment and so matured an experience, that it is simply astonishing to contemplate the amount and variety of new knowledge which he has gained for the world. He was thoroughly systematic in his work, and in preparing his books had a special set of shelves for each standing near or on his writing table, a shelf being devoted to the material which was destined to form each chapter.

His loss is indeed a severe one. It is true that he lives for all posterity in his works, but setting aside the consideration of the value of the work which he would probably have produced had he lived longer, his personal influence was of the greatest possible value to science in this country. His kind encouragement, always extended to original workers, has certainly led to the production of a great deal of valuable work, and many men have had in conducting their researches, at the bottom of their hearts, as a principal incentive, the hope to please him and gain his approbation. To those who had the privilege of being his personal friends his loss must be great indeed. He was the most genial of men, overflowing with good nature and kindness. Although over since his memorable voyage he had suffered more or less from ill health, he appeared ever in the best of spirits, with an intense enjoyment of life, taking the keenest interest in all going on around, and full of excitement and delight at hearing of any new fact or being shown anything that interested him. The almost universal knowledge which he exhibited in conversation was as astonishing as his remembrance of details, yet so extremely modest was he that it always appeared all the time in a perfectly natural way as if he were the recipient and not the source of information.

OUR OLDEST COLONIAL UNIVERSITY.

SINCE the three great universities of the United States—Yale, Harvard, and Columbia Colleges—ceased to be colonial institutions through the declaration of American Independence, our oldest colonial university, and the only one out of Great Britain having a theological faculty connected with the Church of England, is King's College, Windsor, Nova Scotia, which has now been stirred to increased activity through the non-renewal of the government grant by the local parliament of the province. Founded in 1788, fairly well endowed, apart from the government grant, and having had the advantage of a Royal Charter (granted by George III.) since 1802, it has done much for episcopal Protestantism in British North America, and has now the opportunity of doing much more.

In his "Intellectual Development of the Canadian People," Mr. Bourinot, the Clerk of the Canadian House of Commons, referring to the universities, of which there are about a score in the Dominion, says:—"King's College at Windsor, Nova Scotia,—the old home of 'Sam Slick'—was the first institution of a high order founded in the provinces, that it has always remained under the control of the Church of England, and continues to hold a respectable position among educational institutions." Indeed, the "King'sman" has ever been regarded throughout Canada as the ideal of a true gentleman, just as the "Oxonian" is so regarded in Great Britain. For the last half century the University has been open on equal and liberal terms to all denominations for all degrees except those in Divinity; so that amongst the graduates are many who are not members of the Church of England. This being the case a feeling of intense displeasure has been loudly expressed at the suggestion of the Bishop of Nova Scotia (who is visitor of the University, the Archbishop of Canterbury being the patron) that the diminished income due to the withdrawal of the government grant should be compensated for by reducing the Arts and Sciences Professorships.

That the Bishop is open to the charge which has been made against him, that he desired to seize the whole endowment for Divinity purposes, cannot be supposed after his Lordship's denial of that intention, and it now seems evident that the step of his which gave such displeasure was entirely the result of slight misapprehension. It appears that there was no quorum of Governors at the meeting after which his decree as President of the Board was issued, and that the three or four Governors whom he considered supported his action, had merely declared that "if the Government did not renew the grants the professorial staff would have to be diminished," but this was a resolution which required formal sanction from many outside the Board of Governors before it could be acted upon; and one which, moreover, would have had to be made conformable to the University Statutes and to the Common Law. The proposed step would at once have broken up the Arts course, would have caused all the Arts Divinity students of the Diocese of New Brunswick to leave the University, and would doubtless have led many of those of Nova Scotia to have adopted the same course.

It is sincerely hoped that this misunderstanding will have been removed before these observations get back to Nova Scotia, and that visitor, president, and faculties will be unanimous that energy and development, and not uncalled for retrenchment is that which is required for the welfare of the College and the University. This harmony is the more to be desired, as there is a fixed and not unnatural determination on the part of an influential section of the graduates to combine to compel the surrender of the Royal Charter and the dissolution of the University, rather than suffer it to degenerate into a mere Divinity School with university powers. To be a "King'sman" is at present regarded as one of the highest honours obtainable in Canada, but it is universally felt by the alumni that the value of the distinction would be seriously diminished if King's College were reduced to a mere Divinity School. The graduates are content with the Statutes as they stand, and look forward to King's College to become the Church of England University for both Nova Scotia and New Brunswick, if not for the entire Dominion, but they feel that the Arts and Sciences courses must be maintained in their integrity in order that those alumni who are or become Church of England clergymen in Canada may enjoy the same reputation for absence of bigotry and the possession of general knowledge, apart from dogmatic theology, which places the Oxonian and Cantab in Great Britain so far in advance of ministers who have studied in even the best sectarian Divinity Schools in the country.

That the feeling here indicated is general amongst "King'smen" is beyond doubt, and a letter just received from a graduate in New Brunswick, although written in rather strong language, is really but a fair representation of the views entertained by all of them. After stating that he is astonished beyond measure at the recent action of the Board of Governors (which, as has been shown was in truth the action of only some of them), he remarks that he does not know how far their legal powers extend, but it certainly appears to him that they have not behaved with equity to the Faculty, the Alumni, the Under-Graduates, or the Graduates. As a Graduate he feels it an injustice to all Graduates, and as an Alumnus (the Incorporated Alumni is a corporation distinct from the University which has certain powers over the Board and over the College) he feels that the Board of Governors has not kept the trust of the Alumni by endeavouring to objectionably change the College whose rights they were elected to protect. I know, he continues, of no meeting of the Alumni since June last, and certainly such a thing was not then so much as hinted at, as the possibility of the college suddenly collapsing under an arbitrary resolution of the Board of Governors. If this is why King's College was so jealously guarded from consolidation [with the provincial Dissenting Colleges, as was proposed a few years since by some Nova Scotians.—*Ed. S. R.*], why were we not told it in June? Better a hundred times to die honourably in consolidation than live a ghastly cripple to bring disgrace upon its former life. As a devoted King'sman I will, he adds, yield to none, but I would rather by far see King's College come utterly to an end than sink into a miserable starveling Diocesan Divinity School. As a clergyman of the Diocese of Fredericton, I could not vote in Synod in favour of supporting such a deformity.

Fortunately, it is not too late for the mischief to be averted, and publicity will prove the best remedy for the case. The "King'sman" in New Brunswick is, no doubt, fully justified in adding, "I cannot but think that we are being made the victims of a misguided faction, whose insane policy is detrimental alike to the interests of the College and the Church. To combat this a movement must and will be made, and I believe that when the true state of affairs is known, such a flood of indignation will be stirred as will turn the tide of our fortunes, and that we will in time come out of our trials far sounder and better in every way.

An improved *electric lamp* has been patented by Mr. Edwin M. Fox, of New York city. This improvement relates to electric lamps of that kind which give light by the incandescence of a piece of carbon contained in the vacuum chamber.

GENN'S PATENT HOODED SLEEPING BED, OR WATERPROOF NAP-SACK.

THIS is an important and useful appliance for peace or war, explained by the title hereof, serviceable to special correspondents, Alpine tourists, gentlemen going to Norway fishing, boating trips on our rivers, also any persons proceeding to our numerous colonies, where they are likely to have to rough it by camping out for the night, &c. Also to officers of the army for bivouacking on a campaign similar to the Transvaal and other minor expeditions, it will be from its lightness (about 6½ or 7½ lbs.), found very portable, and in case our volunteers are ever called out for service, with the addition of a greatcoat they would be ready to go anywhere they might be required. And they would be found of great value to the surgical profession of the army, as a wounded man might be placed at once secure from the rain or damp ground until he could be attended to, and they also can be carried on the infantry yokes.

Our contemporary, *The Army and Navy Gazette*, of September 10, 1881, remarks:—"Genn's Nap-sacks will be found invaluable to officers of the army for bivouacking purposes." All orders to be addressed to B. Genn, Lynn Road, Ely, formerly of the 15th Hussars, 3rd Light Dragoons (now 3rd Hussars), and 20 years a volunteer in the 1st Cambs. A.B.R.V. We hope to afford our readers the benefit of details with illustrations.

ACTION OF HYDRAULIC CEMENTS UPON EMBEDDED METALS.

JOHN C. TRAUTWINE, C.E., in a communication to the *Railroad Gazette*, dated Philadelphia, January 21, 1882, says:

"The fact that this important subject has of late been brought somewhat prominently before the notice of civil engineers and builders induces me to send you the results of ten years' trial by myself. The hydraulic cements used were English, Portland, and Louisville (Kentucky), besides which I tried plaster of Paris, both pure and mixed, with equal measures of the cements. All were of about the consistency of common mortar; and all were kept in an upper room during the ten years, unexposed to moisture other than that of the indoor atmosphere.

"The metals were partly embedded in the pastes and partly projecting from them. They consisted of cut iron nails (some of which of were galvanised), smooth iron wire nails, brass in both sheet and wire, zinc in sheet, copper wire, and solid cylinders of lead, three-eighths inch diameter.

"The result at the end of ten years was that all the metals in both of the *neat* cements were *absolutely unchanged*; and the same was the case with those in the plaster of Paris, with the exception of the *ungalvanised* nails, which had become covered with a thin coat of rust; as were also those in the mixtures of plaster and cement, but to a less degree.

"This experience leads to the inference (already suggested by others) that moisture or dampness is the injurious agent in those cases of corrosion of iron and lead laid in cement that have lately appeared in the journals; and that if dampness can be absolutely excluded, both cement and lime mortar will probably protect from injury all the metals employed in ordinary constructions, for an indefinite time.

"Such entire exclusion of dampness may at times be somewhat difficult of attainment; for capillary attraction *alone* (unaided by hydrostatic pressure) will cause water to rise several inches in well-hardened cement; and it would be difficult to assign limits to its penetration when aided by a high head of water. Rain water is well known to percolate through many feet in depth of brickwork or masonry laid in lime mortar, even when it consists partly of cement."

The Scientific Review

AND

SCIENTIFIC AND LITERARY REVIEW,

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THE INVENTOR'S INSTITUTE,

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ESTABLISHED 1ST MAY, 1862.

President : HIS GRACE THE DUKE OF MANCHESTER.

Past Presidents :

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P. Sir ANTONIO BRADY, till his decease, 1881.

SESSION 1881—1882.

MEMBERS' MEETING, May 11th, 1882.—Dr. J. McGrigor Croft, "On the Twin Screw Paddle Propeller." Models of several Propellers, with Reports of Competitive Experiments, will be shown.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. CAMPIN, Sec.

Proceedings of the Institute.

At the Members' Meeting, 27th April, 1882, a Paper "On the Pamphengos Lamp," with Illustrations, by Mr. W. C. HUGHES, was read. The Paper will be given *in extenso.*

Monthly Notices.

Mr. W. Menelaus died recently, in the sixty-fourth year of his age. He was for many years manager of the Dowlais Iron Works. The early experiments on a practical scale with the Bessemer process were made at Dowlais under Mr. Menelaus's directions. He was the founder of the South Wales Institute of Engineers, and one of the first members of the Iron and Steel Institute, and became last year the president of that institution.

M. Paul Bert, the most brilliant pupil of M. Claude Bernard, was at the Séance of April 3rd elected a member of the Academy of Sciences in the place of the late M. Bouilland.

The Darwin Medal, founded by the Midland Union of Natural History Societies, has been cut by Mr. Joseph Moore, of Birmingham. It bears a likeness of Mr. Darwin on the one side, and on the reverse an inscription relating briefly the history of its foundation, together with a branch of coral, indicative of one of Mr. Darwin's most important and successful researches.

Royal Institution.—Friday evening meetings at the Royal Institution are—May 12th, A. G. Vernon Harcourt, Esq., "The Relative Value of different Modes of Lighting;" May 19th, a paper by Sir Frederick Bramwell; May 26th. Sir Henry S. Maine, "Sacred Laws of the Hindus;" June 2nd, H. H. Statham, Esq., "The Intellectual Basis of Music;" June 9th, Prof. Burdon Sanderson, "The Excitability of Plants."

Mr. William Edward Gaine, C.E., died on the 20th of March, at the residence of his son at Blackburn, in the sixty-fifth year of his age. Mr. Caine was the inventor of the process for treating paper with strong sulphuric acid, by which is produced the so-called parchment paper which has been manufactured for some years by Messrs. De La Rue and Co.

The Action of Telephonic Currents upon the Galvanometer.—M. de Chardonnet brought before the Academie des Sciences on March 27th his observations "On the Action of Telephonic Currents upon the Galvanometer." If in a telephonic circuit there is placed a very delicate galvanometer, and if the transmitter be acted upon by an organ pipe, the voice, or a tuning fork, no deviation is observed while the sound preserves its intensity, but as it increases or diminishes the needle deviates.

Magnetic Nickeliferous Iron—In the *American Journal of Science* Mr. Lawrence Smith has a note "On the Magnetic Properties of Nickeliferous Iron," found by him in the province of St. Catarina of Brazil. The native mineral contained thirty-four per cent. of nickel; it was then one or two hundred times less magnetic than pure iron; when flattened out by being hammered between two bright surfaces the flattened metal was attracted by the magnet, and if heated to redness it became as susceptible to the magnet as iron is. This and other specimens have been examined by M. Henri Becquerel, who has published a memoir on them in the *Comptes Rendus.*

The Cambridge Press will publish very soon a volume of "Mathematical and Physical Papers" by Sir William Thomson. Amongst the papers included will be the series "On the Dynamical Theory of Heat," published from 1851 to 1878, with the addition of one "On Thermodynamic Motivity," published in 1879; also the joint papers by Dr. Joule and Sir William Thomson "On the Thermal Effects of Fluids in Motion." The second volume of the "Mathematical and Physical Papers" of Prof. G. G. Stokes is nearly complete.

M. Henri Giffard, the French engineer, lately deceased, will be best known in England by his "injector." Giffard devoted a large part of his time and much money to experiments in aerostation. Especially he invented a balloon, ellipsoidal in form, and with an helix attached which was used as an instrument of prosion.

Anniversary Banquet to M. Chevreul.—On March 5th, a banquet was given by the French National Society of Agriculture to its President, M. Chevreul, in commemoration of the fiftieth anniversary of his election.

THE SCIENTIFIC REVIEW
AND
Scientific and Literary Review
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MAY, 1882.

THE TWO PATENT BILLS.

The Patents for Inventions (No. 2—Society of Arts) Bill, read a second time 28th April, 1882, has been printed and issued in official Parliamentary form. The full account thereof being set forth in Mr. Morgan's Paper in our last renders it unnecessary to do more than present our readers with a synoptical account thereof. It repeals scheduled enactments and rules, has an interpretation clause, and excepts patents for inventions from the statute of monopolies as now the law.

The subject-matter of Patents is set forth as being any manner of manufacture; any product not being a natural product; any machine or any means for producing any manufacture, product, or result; any process or method of producing any manufacture, product, or result. Any part of a machine means process or method of producing any manufacture, product, or result.

A Patent may be granted to any person declaring himself to be an inventor, or his executor, administrator, or assign, or agent or attorney thereof. Patents must be taken within eighteen months after date of Foreign Patent. The above refer to clauses 1 to 9.

The Board of Commissioners for Patents and Examiners of Patents will be found described in our last, also the application for Patent by

10. Lodging application and provisional specification
11. Provisional protection.
12. Reference to and report by Examiner.
13. Complete specification.
14. Applicant may lodge complete specification in the first instance.
15. Further reference to and report by Examiner.
16. Publication of complete specification and effect thereof.
17. Opposition to grant of patent.
18. Sealing of patent.
19. Date and time for sealing patent.
20. Duration of patent (17 years from date).
21. Extent of patent (same as now)
22. Certificate of renewal of patent, or payment of deferred stamp duties.
23. Proceedings for obtaining amendment of specification.
24. Further as to application for prolongation of patent (*1) when 17 years have expired.
25. Power of Commissioners to grant prolongation (*2).
26. Stamp duties to be as in Schedule (*3).
27. Patent to bind Crown subject to provisions for naval and military services.
28. Assignment for part of United Kingdom.
29. Order of Commissioners for grant of licenses in certain events (*4).
30. Register of patents.
31. Register of proprietors.
32. Inspection of registers.
33. Correction of registers (*5).
34, 35, 36. The Revocation of Patents is to be in the power of the Commissioners, and by abolition of *scire facias*, they are empowered as to proceedings for revocation of patents and to grant new patents on revocation for fraud (*6).
37. The Bill also deals with foreign vessels in British waters.
38. Protection of inventions from consequences of public use at exhibitions. These being much the same as the law now existing.

The following are clauses very similar to Patent Amendment Act, 1852:—

39. Patent to true inventor not invalidated by application in fraud of him. By the Interpretation Clause (*ante*) the publication and use of an invention up to 30 years gone bye does not upset a patent.
40. Falsification of entries in registers.
41. Penalty for unauthorised use of name of patentee, of word patent, &c.
42. False declaration a misdemeanour.
43. Power of commissioners to extend time in certain cases.
44. Costs of opposition.
45. Particulars of opposition or petition for revocation.
46. Assistance of expert.
47. Patent Office.
48. Remuneration of Commissioners and Examiners (this is new, of course).
49. Officers and clerks.
50. Duties of Commissioners as to publication of *Patent Journal* and other matters.
51. General rules for management of Patent Office and business of Commissioners.
52. Rules to be laid before Parliament.
53. Copies of documents admissible in evidence.
54. Annual report of Commissioners.
55. Quorum of Commissioners (new).
56. Occasional appointment of Examiner to act as Commissioner (new).

The defence of Patent Right by Action of Infringement in the ordinary High Court is dealt with—

57. By delivery of particulars (*7).
58. Certain pleas in actions for infringement abolished (*8).
59. Plea that invention is not new (*9).
60. Order for inspection, &c., in action.
61. Certificate of validity questioned and costs thereon.
62. Security for costs in case of "endorsed" patent (*10).
63. Duty of Commissioners to act as assessors on request of court or judge (*11).
64. Reference to Commissioners of cases triable by referee (*12).
65. Duty of Commissioners to act as arbitrators (*13).
66. General rules as to arbitration (*14).
67. General Powers of Commissioners (*15).
68. Power of Commissioners and Examiners to administer oaths (*16).
69. Enforcement of orders of Commissioners (*17).
70. Evidence of documents (*18).
71. Collection of fees (*19).
72. Notices, how to be given (*20).
73. Existing patents to pay £30 at third year and £60 at seventh year (*21).
74. Existing registers.
75. Pending applications.
76. Transfer of property, &c., of existing Commissioners.
77. Savings from repeal.
78. Transfer of power of existing Commissioners in relation to trade marks and copyright of designs.

Scotland.—79. Recovery of penalties. 80. Payment of costs ordered by Commissioners. 81. Saving for courts. 82. Proceedings for revocation of patent.

Ireland.—83. Reservation of remedies. 84. Reservation of powers to Crown. 85. Saving for prerogative.

Schedules.—The First Schedule—Acts Repealed. The Second Schedule—Form of Letters Patent. The Third Schedule—Stamp Duties.

These stamp duties are:—

On application for patent	2	10	0
On grant of patent	5	0	0
On certificate of renewal in fourth year of patent	20	0	0
On certificate of renewal in eighth year of patent	50	0	0
On application to amend specification	2	10	0
On order giving leave to amend	2	10	0
On order prolonging patent—for each year of prolongation	10	0	0
On certificate of record of notice of appeal against decision of Examiner	1	1	0
On certificate of record of notice of opposition to any application	1	1	0

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*1 to *21 relate to matters worthy of detailed notice, which we may in future place before our readers.

The Bill to amend the Law relating to Patents for Inventions. Prepared and brought in by Mr. ANDERSON, Mr. BROWN, Mr. JACKSON, and Mr. HINDE PALMER:—

Whereas Letters Patent for Inventions are now granted and regulated under the following Acts: fifteenth and sixteenth Victoria, chapter eighty-three; sixteenth and seventeenth Victoria, chapter five; sixteenth and seventeenth Victoria, chapter one hundred and fifteen; and twenty-second Victoria, chapter thirteen; and it is desirable to amend these, as regards the appointment of paid Commissioners, duration and costs of patents, and in other matters.

1. This Act shall come into operation on the first day of January, one thousand eight hundred and eighty-three.

2. Her Majesty may from time to time, by warrant under her sign manual, on the recommendation of the Lord Chancellor, appoint an officer to be called the Chief Commissioner of Patents for Inventions, and on the recommendation of the President of the Board of Trade two officers to be called respectively Second and Third Commissioners of Patents for Inventions; and these officers shall hold their offices during Her Majesty's pleasure.

3. Salaries of paid Commissioners:—First, £1,500; Second, £1,200; Third, £1,000.

4. It shall be the function of these three paid Commissioners to do all the duty hitherto performed by the unpaid Commissioners and the Law Officers, whose duties shall thereupon cease, to take over the establishment from them, and to manage all the business of the Patents for Inventions Office of the United Kingdom, and to perfect its organisation; more particularly in the matter of a library of records and registers, so indexed and arranged as to facilitate searches, and to be easily accessible to the public under such reasonable regulations and small fees as the Chief Commissioner with approval of the Lord Chancellor may from time to time prescribe. On receiving a petition for grant of Letters Patent, they shall cause the registers to be searched for prior inventions on the same subject, and if any are found that seem to bar the claim to novelty, the petitioner shall be referred to these for consideration before any further fee is demanded: and if the petitioner asks to be heard, the Commissioners, or one of them, shall hear him and may advise him as to further procedure.

5. Duration of new Letters Patent 21 years.

6. Application of Act to existing Letters Patent; that is to say, the same stamp duties as in schedule to be paid.

7. After a patent shall have been sealed, the failure to pay the stipulated duty at any of the subsequent terms when due shall not invalidate the patent, provided at some period before the expiry of twelve calendar months after such due date the duty shall have been paid, together with such amount of fine as is specified in the appended schedule of fines for postponed payments, but failing that the patent becomes void.

8. Stamp duty clause.

9. The term for provisional protection shall henceforth be extended to twelve months, and the patent when sealed, shall date as of the day on which the petition for Letters Patent was left at the Office of Patents for Inventions by the applicant.

10. At any time subsequent to the sealing of a patent it shall be in the power of its owner to add to it such improvements as he may desire unless the Chief Commissioner shall decide that the improvement proposed is not a legitimate addition to the patent, but is more properly the subject for a new patent. For every such addition to a patent, or procedure connected with such addition, there shall be paid one half of the initial stamp duties, and subsequently one half of each stamp duty still remaining to be paid, as these may fall due on the original patent, or with proportionate fines for postponed payment. Any such addition to a patent shall expire along with the original patent.

11. Patent rights good against Crown, but may be used for public service on terms to be agreed on.

12. Employment in the public service shall not preclude any person from taking out or owning a patent or from any participation in the privileges of a patentee, but this provision shall not apply to any person employed in the Office of Patents for Inventions.

13. The short title of this Act shall be the Patents for Inventions Act, 1882.

Schedule of Stamp Duties.

On petition for grant of Letters Patent	1	10	0
On certificate of record of notice to proceed	1	0	0
On the sealing of Letters Patent	1	0	0
On the Specification	1	0	0
On Letters Patent at the end of seven years	20	0	0
On Letters Patent at the end of twelve years	20	0	0
On Letters Patent at the end of seventeen years	20	0	0
On certificate of record of notice of objections	1	0	0
On certificate of every search and inspection	0	1	0
On certificate of entry of assignment or license	0	5	0
On certificate of assignment or license	0	5	0
On application for disclaimer	1	0	0
On caveat against disclaimer	1	0	0
On office copies of documents for every 90 words	0	0	2

On every addition to a patent one half of the above stamp duties.

Schedule of Fines for Postponed Payments.

If paid within three months after due date, 25 per cent. on the duty then due.

If paid not within three but within six months after due date, 50 per cent. on the duty then due.

If paid not within six but within nine months after due date, 75 per cent. on the duty then due.

If paid not within nine but within twelve months after due date, 100 per cent. on the duty then due.

On every addition to a patent, one half of the above fines.

FARE REGISTERS.—Mr. M. W. Speulda, of Springfield, Ill., has patented an improvement in fare registers of that class which are to be carried by the conductor, and operated as each fare is received to register the number of fares taken. This register has a pull bar which gives a step-by-step movement to a train of wheels bearing numbered dials, and simultaneously rings a bell at each movement.

SOLVENT FOR GALLIC ACID.—Mr. Frederick Long says, in the *British Medical Journal*, that he has accidentally discovered a method of dissolving gallic acid. Having a short time since a case of hæmaturia, the result of uric acid gravel, he chanced to prescribe a mixture containing half a drachm of gallic acid and a drachm and a half of citrate of potassium, and to his surprise he found he had a perfectly clear liquidf the gallic acid being completely dissolved. He has since made further experiments, and he finds that, with care, twenty grains of citrate will dissolve as much as fifteen grains of gallic acid in an ounce of water, and remain quite clear for any length of time. To be able to give gallic acid in perfect solution is a great advantage, as absorption must take place more rapidly when the salt is in solution than when simply suspended in mucilage. The citrate, being a very simple salt, can do no harm in any cases in which gallic acid is required.

Proceedings of Societies.

ROYAL SOCIETY.

MARCH 30.—The President in the chair.—The following papers were read:—"On the Development of the *Ossicula auditus* in the Higher Mammalia," by Mr. A. Fraser.—"Description of Portions of a Tusk of a Proboscidian Mammal (*Notelephas Australis*, Owen)," by Prof. Owen.—"Action of Ethylene Clorhydrine upon the Bases of the Pyridine Series and on Quinoline," by Prof K. A. Wurtz.—And "On the Movement of Gas in Vacuum Discharges," by Messrs. W. Spottiswoode and J. F. Moulton.—The Society adjourned over the Easter recess.

CHEMICAL SOCIETY.

MARCH 30.—Anniversary Meeting.—The President, Prof. Roscoe, gave his annual address, and congratulated the Fellows on the satisfactory condition of the Society, both numerically and financially. There are now 1.175 Fellows enrolled on the register.—Dr. Gilbert was elected President for the ensuing year.

APRIL 6.—Dr. Gilbert, President, in the chair.—The following papers were read:—"On the Action of Acetyl Chloride on Fumaric Acid," by Mr. W. H. Perkin. The author criticises the statements of Auschütz, and considers that the views of that chemist as to the above reaction are unsatisfactory. Probably the acetyl chloride removes a molecule of water from the fumaric acid yielding maleic anhydride.—"Some Arguments in Favour of the Prism Formula of Benzene," by Mr. U. K. Dutt.—"On a Convenient Apparatus for the Liquefaction of Ammonia," by Mr. J. E. Reynolds. This essentially consists of a stout iron U-tube, into one leg of which is cemented a stout glass tube containing dry ammonia gas; the other leg of the U, which is closed by an iron cap, contains some strong solution of ammonia; the intermediate space is filled with mercury. On heating the solution, pressure is produced sufficient to liquefy the gas.—"On the Transformation of Urea into Cyanamide," by Mr. H. J. H. Fenton. On gently heating urea with metallic sodium a violent reaction ensues, hydrogen is evolved, and a body having the composition and all the properties of cyanamide is formed.—"On the Action of Haloid Acids upon Hydrocyanic Acid," by Messrs. L. Claisen and F. E. Matthews. A crystalline substance having the formula $2HCN+3HCl$ is obtained. By the action of alcohol on this body the hydrochloride of the base HC,NH,NH_2 was prepared.

THE INSTITUTION OF CIVIL ENGINEERS.

APRIL 4.—Mr. Brunlees, V.P., in the chair.—It was announced that the Council had recently transferred Messrs. W. Elliot, J. W. D. Harrison, T. Hennell, A. Latham, W. L. Owen, and R. Quigley to the class of Members; and had admitted twenty-two gentlemen as Students.—At the monthly ballot Messrs. C. La F. Hillman, S. Jackson, and J. M. R. Lisboa were elected Members; N. Bennaton, A. H. Birkinshaw, H. G. Boyce, W. Colson, W. Cross, T. V. Davison, W. Gumbley, H. Gore, D. B. Horn, L. M. Kortright, D. W. McArthur, W. Matthews, J. T. Shand, W. G. Strype, and E. G. Woodford, Associate Members; and C. McG. Bate an Associate.—The paper read was "On the Theory of the Gas Engine," by Mr. D. Clerk.

ROYAL INSTITUTION.

APRIL 3.—Mr. G. Busk, Treas. and V.P., in the chair.—Mr. B. Baker and Mr. W. E. Rich were elected Members.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

APRIL 5.—Rev. Dr. Sparrow Simpson in the chair.—Some interesting Roman coins found in Southwark were exhibited by Mr. R. E. Way; and a vase of unusual form found at Homerton, close to the banks of the Lea, was described by Mr. W. G. Smith.—A series of mediæval tiles, from various excavations in London, was exhibited by Mr. L. Brock, who pointed out the beauty of some of the patterns. They belonged probably to some of the City churches burnt in 1666.—A paper by the Chairman was then read on a tonsure plate formerly used by the ecclesiastics of St. Paul's Cathedral. The original is in the British Museum, where it has recently been identified by Mr. W. de Gray Birch, but a cast of it was exhibited by the lecturer. It has a quaint lion rampant engraved on one of its surfaces, and is of small dimensions. The attached parchment inscription testifies to its use. The various customs relating to the shaving of the clergy and the mode were passed in review, and many authorities were quoted, particularly those having reference to its use at the metropolitan cathedral.—The second paper was by Mr. T. Morgan, in which were described the markings on many Roman tiles found in London, all of which when read from right to left give the letters PPBR. LON. There are several examples in the Guildhall Museum, and a good specimen, from the Roman building recently found on the site of Leadenhall market, was exhibited by Mr. C. Brent.—The Chairman called attention to the demolition now in progress of the mediæval wall of London on the south side of Ludgate Hill.—The third paper, by Sir Lewis Jarvis, was descriptive of the fine castellated brick building Middleton Towers, near Lynn, belonging to Sir Lewis, who has converted it from a complete ruin into a commodious mansion. It is surrounded by a moat, and the principal portion consists of a large gateway with turrets, the date being the early part of the fifteenth century.

ZOOLOGICAL SOCIETY.

April 4.—Prof. W. H. Flower, President, in the chair.—Mr. Sclater exhibited and made remarks on an example of a rare fly-catcher (*Cyanomyias cœlestis*) from the Philippines. He also exhibited and made remarks on two specimens of the subcylindrical horn-bill (*Buceros subcylindricus*) formerly living in the Society's Gardens.—Papers and letters were read: by Dr. A. Gunther, on a new species of freshwater turtle from Siam, a specimen of which had been recently acquired by the British Museum, and which Dr. Gunther proposed to name *Geoemyda impressa*, from the peculiar shape of the principal upper plates, which are not merely flattened, but distinctly concave,—by Mr. W. A. Forbes, on the structure of the convoluted trachea of two species of manucode (*Manucodia atra* and *Phonygama Gouldi*), and on similar conformations in the tracheæ of other birds,—by Mr. J. E. Harting, on the eggs of three species of wading birds obtained in the neighbourhood of Fianarantsoa in the Betsileo country, Madagascar; the species to which these eggs belonged were *Glareola ocularis*, *Ægialitis Geoffroyi*, and *Gallinago macrodactyla*; and much interest attached to these eggs, as not having been previously described,—and from Mr. E. P. Ramsay, on a supposed new species of Tephras, an example of which had been obtained by the late Mr. S. White while collecting at the Aru Islands. The author proposed to name it *Tephras Whitei*, after its discoverer.

MATHEMATICAL SOCIETY.

April 6.—Mr. S. Roberts, President, in the chair.—Messrs. Buchheim, Muir, and C. Smith were admitted into the Society.—The following communications were made: "The Algebraic Solution of the Modular Equation for the Septic Transformation," by Mr. G. S. Ely,—"Note on the Condensation of Skew Determinants which are partially Zero-Axial; and on a Symmetric Determinant connected with Lagrange's Interpolation Problem," by Mr. T. Muir,—"On the Analogue to the Addition Equation for Theta Functions," by the Rev. M. M. N. Wilkinson,—"On the General Equation of the Second Degree referred to Tetrahedral Co-ordinates," by the Rev. A. J. C. Allen,—"On certain Loci and Envelopes belonging to Triangles of given Form inscribed and circumscribed to a given Triangle," by Prof. Wolstenholme,—"On Binomial Biordinals," by Sir J. Cockle,—"On the Co-ordinates of a Plane Curve in Space," by Mr. H. W. L. Tanner,—and "On Polygons circumscribed about a Cuspidal Cubic," by Mr. R. A. Roberts.

ARISTOTELIAN SOCIETY.

April 3.—Mr S. H. Hodgson, President, in the chair.—A discussion took place on "Consciousness and its Dependent Ideas: Feeling, Sensation, Emotion, Memory, Imagination, Perception, Thought, Cognition, and Volition."

SHORTHAND SOCIETY.

April 4.—Mr. C. Walford in the chair.—Mr. G. Clulow and Mr. A. J. Frost were elected Members.—A paper entitled "The Principles of Legible Shorthand," by the author of the system, Mr. E. Pocknell, was read by Mr. A. E. C. White.

ASTRONOMICAL SOCIETY.

April 14.—Mr. E. J. Stone, President in the chair.—Mr. R. T. Pett was elected a Fellow.—A paper was read by Prof. Newcomb, in which the author made some criticisms upon the instructions to observers of the coming transit of Venus which had been formulated by the Paris International Conference.—The President thought that Prof. Newcomb's objections were chiefly to the words in which the instructions had been drawn up; they would, however, receive the careful attention of the Committee, and he regretted that they had not been received earlier.—Mr. Green called attention to a recent drawing of the planet Mars by Prof. Schiaparelli, in which most of the fine lines or "canals" were represented double. Mr. Green had been unable to verify these by his own observations, and thought that in many cases the lines should rather be considered as the boundaries of faintly shaded regions.—The President read a paper upon some of the results obtained from the meridian observations of Mars made at the Cape of Good Hope, Melbourne, Leyden, and Washington.—The following papers were also read: "On the Inclination of the Ring of Saturn to its Orbit, deduced from Washington observations," by Prof. E. S. Holden,—"Conjunctions of the Interior Satellites of Saturn,' and "Observations of the Companion of Sirius," by Prof. A Hall,—"On the Best Mode of Undertaking a Discussion of the Observations of Contact to be made at the Approaching Transit of Venus," by Mr. D. Gill,—"Errata in the First Melbourne General Catalogue of Stars," by Mr. R. L. J. Ellery,—"The Variable Star β-Ursæ Minoris," by Mr. T. E. Epsin,—"Note on Mr. Neison's Paper on the Corrections to Adams's Semi-Diameter of the Moon," by Mr. E. Neison,—and "Alleged Errors in the Time Record of Observations of the Transit of Venus, 1874, at Hermitage, Rodriguez," by Lieut. W. M. Moore.

GEOLOGICAL SOCIETY.

April 5.—Mr. J. W. Hulke, President, in the chair.—Mr. W. J. H. Milne was elected a Fellow, and M. A. Milne-Edwards, of Paris, a Foreign Correspondent of the Society.—The following communications were read: "Geological Age of the Taconic System," by Prof. J. D. Dana,—"On some Nodular Felsites in the Bala Group of North Wales," by Prof. T. G. Bonney,—and "On the Cambrian (Sedgw.) and Silurian Rocks of Scandinavia," by Mr. J. E. Marr.

ARCHÆOLOGICAL INSTITUTE.

April 6.—Mr. J. Hilton in the chair.—A paper by Mr. E. A. Freeman "On Sens and Auxerre" was read.—Mr. E. Peacock sent a transcript, from the Episcopal Register at Lincoln, of a "Professio" made in the Benedictine Nunnery of Little Marlow, Buckinghamshire, to Margaret Vernon, the little prioress, before John Longland, Bishop of Lincoln (1520-1547), by "suster Constance petronill' Anne," who vows, offers, and fully gives herself to serve Almighty God during her natural life, and renounces for ever and utterly forsakes the world and property of temporal substance, &c., and takes upon herself wilful poverty, utterly forsaking her own proper will. The bringing to light of this document by the Rev. A. R. Maddison forms a small but interesting addition to the scanty published accounts of the nunnery of Little Marlow.—The Chairman exhibited a silver-gilt collar of SS, apparently Flemish work, and Mr. Hartshore contributed some notes upon SS collars in general.—Mr. Hilton exhibited a collection of early keys, a bronze celt, and a large Italian fibula.—Mr C. R. B. King sent some illustrations of the undercroft of the church of the Kights of St. John of Jerusalem at Clerkenwell, and drawings of a baldachino lately removed from the church of St. Mary, Totnes.

ENTOMOLOGICAL SOCIETY.

April 5.—Mr. H. T. Stainton, President, in the chair.—A box of Hymenoptera, mounted on glass, by Mr. J. R. Billups,—a remarkable Coccinella, intermediate between *C. oblongoguttata* and *ocellata*, by the Rev. H. S. Gorham,—and a very complete collection of British Trichoptera, by Mr. R. McLachlan, were exhibited.—Mr. A. G. Butler communicated a paper in continuation of his "Heterocerous Lepidoptera collected in Chili by T. Edmonds, Esq.," in which forty-five species of Noctuæ were noticed.

ANTHROPOLOGICAL INSTITUTE.

April 4.—Major-General Pitt-Rivers, President, in the chair.—The election of Mr. E. F. im Thurn was announced.—The President exhibited a series of carvings and painted masks from New Ireland.—A paper on the Papuans and Polynesians was read by Mr. C. S. Wake, who, from a consideration of the physical peculiarities of the Oceanic races, arrived at the following conclusions:—1. The eastern archipelago was, at a very early period, inhabited by a straight-haired race belonging to the so-called Caucasian stock, the present modern representatives of which are the Australians. 2. To this race belonged also ancestors of all the Oceanic races, including the Papuans, the Melanesians, the Micronesians, the Tasmanians, and the Polynesians, as shown by their common possession of certain physical characters. 3. The special peculiarities of the several dark races are due to the introduction of various foreign elements, the Negritos having influenced all of them in varying degrees. 4. The lighter Oceanic races show traces of the Negrito influence, but they have been affected at various periods by intermixture with peoples from the Asiatic area, giving rise on the one hand to the so-called "savage Malays," and on the other hand to the Polynesians, who have been specially affected by the Malays. 5. Traces of an Arab or Semitic element are apparent among both the dark and light Oceanic races, but chiefly among the Papuans and the Melanesians, the former of whom may also possibly possess a Hindoo admixture.—Mr. C. Pfoundes read a paper "On Rites and Customs in Old Japan," and exhibited a number of photographs and Japanese books and pictures.

April 25.—Hyde Clarke, Esq., Vice-President, in the chair.—The following elections were announced: Alfred Morrison, F.R.G.S., and Frederick Harold. The chairman alluded to the great loss sustained by the death of Mr. Charles Darwin, who was an Honorary Member of the Institute, having been also a Fellow of the Ethnological and of the Anthropological Society. Professor Flower also made some remarks upon the same subject.—Mr. E. H. Man read a paper "On the Aboriginal Inhabitants of the Andaman Islands," in continuation of a paper read before the Institute by the same author on March 7.

NEW SHAKESPERE.

April 14.—Mr. F. J. Furnivall, Director, in the chair.—Dr. Bayne read a paper "On Shakspere's Characters contrasted with those of George Eliot," and in conclusion observed that Shakspeare, had he lived now, would have preferred the novel to the drama as a mode of expression.—Mr. Furnivall said that Shakspeare as well as George Eliot had no heroes, the nearest being Brutus. He doubted whether novels could last so well as dramas.

TESTIMONIAL TO MR. JOHN GOUCHER.

Mr. John Goucher, the inventor of the well-known Patent Diagonally Grooved Drum Beater for threshing corn, having conferred a great service to agriculturists, it is proposed to present him with a testimonial, to take the form of a purse—well filled, it is hoped—in recognition of the service he has thus rendered.

It is generally admitted that Mr. Goucher, by the introduction of his beater, has been a benefactor to the agriculturists of this country. The threshing machines, prior to his improvement, cut and bruised the grain, causing great loss to the farmer. In consequence of the great injury done to the grain, the threshing machine could not be used to practical advantage, and the old slow process of threshing corn by the flail continued to be the general method in this country until the repeal of the corn laws, when Mr. Goucher invented his beater, which renders the threshing machine capable of that rapidity of action necessary to deal with quantity, and effect clean threshing.

Many efforts have been made to improve beaters and the process of threshing—as evidenced by the number of patents taken out—but Mr. Goucher is the only inventor who has succeeded in surmounting the considerable difficulties of successfully threshing grain by machinery without injury, and his invention has largely contributed to the universal adoption of machinery for threshing corn.

The principle of the beater is known as the diagonal groove, which presses and rubs the grain out of the ear without beating to injure it.

The cutting and bruising of grain caused great annual loss to the farmer, and it has been repeatedly calculated both by Miller and Maltster that when grain is cut and bruised, its value is depreciated to the extent of fully 6d. a bushel, the best corn being most liable to injury.

According to the returns of the Board of Trade for the year 1878, there appears to be grown in the United Kingdom 3,321,065 acres of wheat and 2,652,300 acres of barley, making together 5,973,365 acres, but taking 4,480,024 acres, which is only three-fourths of the amount of wheat and barley grown according to this return, and estimating the average at 26 bushels an acre, and the loss formerly caused by injury to grain at 4½d. per bushel only, there would be an annual saving of £2,184,011 14s. 0d. by the use of Mr. Goucher's invention, and as the beater has now been in use for 33 years—but if we say 23, thus allowing 10 years for its introduction—the saving to the United Kingdom from non-injury to grain would be £50,232,269 2s. 0d., a small percentage of which should surely go to Mr. Goucher, who is at present not only in reduced circumstances but in declining health.

In show yard competitions the prices have always been carried off by machines fitted with beaters of Mr. Goucher's pattern, and medals and certificates of merit have been specially awarded to the inventor. But whilst aiding to produce an effective threshing machine, and creating a large new trade in this branch of industry, Mr. Goucher has had to contend against imitators and persons contesting his patent rights, thus depriving him of the profit and recompense he so richly merited and would otherwise have received. In fact, all the profits derived from the invention were absorbed in law expenses, and Mr. Goucher left to struggle on as best he could, in straitened circumstances, while others reaped the benefit of his valuable invention.

Testimonials of a substantial nature have been presented to Mr. Fowler and Mr. Bell respectively in recognition of their inventions connected with the reaping machine and steam plough, and it is suggested that a similar compliment should be paid Mr. Goucher, in recognition of his invention and its value to the farmer; and it is hoped that the proposal will meet with that generous appreciation generally shown to those who have been benefactors of their fellow countrymen.

RECENT AMERICAN AND FOREIGN PATENTS.

An improved *sewing machine work-basket* has been patented by Mr. Joseph Le Roy Parkinson, of Cambria, Wis. The device is attached to machines already made, which have side drawers and a side plate or brace, for giving the board additional support and strength. In new machines there is a brace cast upon one of the legs of the machine for supporting the wing to which the basket is attached.

A device for *dressing saw teeth* has been patented by Mr. Edmund Holderman, of Liberty Mills, Ind. The object of this invention is to give uniform set to saw teetn after having been set and filed. The invention consists in a bar of metal having set screws and an adjustable guard for gauging the degree of set in saw teeth, and suitable clamping devices for holding a reversible file at any desired angle of inclination.

Mr. Albert Berryhill, of Pittsburg, Pa., has patented an improved *nut lock*, which consists of two grooved blocks held in a longitudinal slot of a plate placed on the bolts and over a recessed plate, which in turn is placed against the fish-plate or against a plate resting against the fish-plate, which blocks are held against the nuts to prevent them from turning by a locking wedge placed between them and into the recess of the recessed plate, parts of the slotted plate being bent outward to form an aperture to admit the locking wedge.

An improved *harvester finger bar* has been patented by Mr. Abner D. Dailey, of Riley, Ind. This invention relates to improvements in the finger bars of that class of harvesters in which the cut grain falls upon an endless belt or carrier in rear of the cutters, which belt conveys the cut grain to an elevator, and thence to a grain binder. In this class of harvesters, as now constructed, the endless belt or carrier is arranged above the cutter bar, and has its front edge a short distance in rear of the cutter bar, whereby an open space is left between the endless belt and the back of the cutter bar, into which short grain and cut weeds fall, causing the loss of the short grain and the clogging of the belt by the weeds and short grain winding around the belt rollers. To remedy these defects is the object of this invention. The finger bar is composed of a metallic plate bent so as to form upper and lower horizontal flanges parallel with each other, the frame of the endless belt being secured between the flanges and fingers bolted to the upper flange, which upper flange is also provided with slots for the passage of the endless belt in its revolution, whereby the outer edge of the endless belt revolves in contact with the back of the cutter bar, and the upper face of the belt is flush with the cutter bar and carries the butts of the wheat as fast as the heads, thus bringing the stalks straight to the elevator.

An improved *station indicator* has been patented by Messrs. William H. Hackney, of Laramie county, Wyoming Territory, and Edward G. Hudson, of Lincoln, Ill. The improvement consists in the peculiar means for reversing the movement of the ribbon when wound up, for which purpose the inventors place an intermediate shaft between the two shafts carrying the belt or ribbon. This intermediate shaft has a cog wheel adapted to engage with cog wheels on the ribbon shafts alternately by the lateral shifting of this intermediate wheel, the wheels on the ribbon shafts being set in different planes to permit this action, and the intermediate wheel being shifted by the longitudinal movement of the shaft, which is held by a latch entering one of two circumferential grooves in the shaft.

An improved *switch board* for use in connection with annunciator or burglar alarms has been patented by Mr. Lambert F. Fouts, of Greenfield, Iowa. The several doors and windows of a dwelling, hotel, or other structure, or any other desired points, are connected in a closed circuit with a battery, an alarm, and the improved switch board, the latter having a pivoted button and fixed post for each door or point in the circuit. When a "break" is made—as, for instance, when a door is opened—it may be located by moving one or more of said buttons until the restoration of the circuit through branch wires connected with the aforesaid posts and the consequent arrest of the alarm give the required indications.

An improved *inkstand*, which closes itself automatically, and can be opened readily, has been patented by Mr. Charles De Roberts, of Albion, Neb. The invention consists in an ink well resting on a base, and provided with a lid or cover attached to the upper end of a bell crank lever pivoted in the base, the lower end of which bell crank lever rests on one end of a lever pivoted to the under side of the base, and provided at the other end with a knob projecting above the top of the base, which knob is depressed by the hand when the cover is to be raised.

A hair pin which, when inserted in the hair, will so grasp and hold the lock or mass of hair enclosed within the prongs that the hair pin will not be liable to drop or work out from the hair has been patented by Mary T. Foote, of Boston, Mass. The ends of the hair pin are first bent out and then in toward each other, so as to form at the point a clasp which seizes and holds a lock of hair, and the exterior shoulders of which bent portion also prevent the pin from slipping out.

Compound engines, patented by Mr. Michael Elsesser, of Brooklyn, N. Y., of that class of steam engines which have two cylinders, one larger than the other, the larger cylinder taking steam from the exhaust of the smaller or primary cylinder, consist principally in forming the valves of the two cylinders integral, and providing the same with a conduit for leading the exhaust steam from the primary cylinder to the inlet ports of the secondary cylinder and with an exhaust passage for the steam from the secondary cylinder, the valves and connecting conduit being contained in the valve chamber, and entirely surrounded by steam from the boiler.

Valve reversing gear has been patented by Mr. John M. Sailer, of Ionia, Mich., and consists of a novel eccentric adjusting cam in combination with the valve rod eccentric, the latter being loosely fitted on the engine shaft.

The *stern of screw-propeller steamers*, as patented by Mr. Joseph W. Davis, of Port Jefferson, N.Y., provides a strong and rigid bearing for the outer ends of the propeller shafts of steamboats having a propeller shaft at each side of the rudder; and also to prevent one screw from disturbing the water of the other screw. The invention consists in a steamboat hull constructed with three stern posts, to the centre one of which the rudder is pivoted, the two screw shafts having their bearings in the side stern posts.

Stamp mills.—Mr. James F. Marvin, of Fort McDowell, Arizona Territory, has recently patented an improvement in stamp mills. The object of this invention is to increase the yield of stamps in dry crushing. The invention consists in the arrangement of two stamps with an inclined bed on one of the stamps having a rotary grinding motion between its strokes.

Saw-mills.—A pressure roller for saw-mills has recently been patented by Mr. Charles E. Lewis, of Bay City, Mich., and consists in a crosshead having downwardly projecting arms, a double crank shaft pivoted to the arms of the crosshead, and rollers placed upon the cranks, this arrangement permitting the rollers to adjust themselves to bear equally upon the logs, whether the logs be equal or unequal in thickness.

Car couplings.—Mr. Henry Wells, of Glenwood, Iowa, has patented an improvement in car couplings. This invention relates to self-couplers, and it consists of a shouldered drawbar designed to be fitted on the angle formed by the end and bottom of a car, having a flaring mouth and a longitudinal slot in its top for the movement of the coupling hook; and it consists also of a peculiarly-shaped slotted coupling hook and in novel devices for uncoupling.

Rolling mills.—Mr. Christopher Lewis, of Columbus, Ohio, has patented an ingenious feed device for rolling mills. This invention has reference to a previous invention by the same party, covering a rolling mill for rolling railroad roads, &c., in which the rail had a continuous passage through a succession of reversely moving sets of rolls, and was transferred from each pair of rolls to the next pair, by means of laterally adjustable buggies, whereby labour has been economised and a rapid and practical automatic action secured. The present invention relates to the construction and arrangement of a feeder for such rolling mill, or a device for transferring the bloom to the furnace, and also from the furnace to the first pair of rolls; and to this end it consists principally in one or more buggies pivoted at one end in line with the first pair of rolls, and having its other end arranged to swing upon a curved upon a curved track, so that it may be swung out to the line in which the bloom is withdrawn from the furnace and then returned to the line of feed to the rolls. The invention also consists in the combination with these swinging buggies of shafts, clutches, drums, and chains for operating them, and also in the combination of the supporting rollers of these buggies with devices for rotating them to advance the bloom whenever the buggy is thrown into line with the rolls.

A combined tooth and colter for grain drills, by means of which grain may be drilled in stubble land and sod without previous ploughing, has been patented by Messrs. Barclay Thorne and James Evans, of Junction City, Mo. The device, which may be attached to any ordinary grain drill, consists of a tapering tooth, terminating in a triangular neck and a three-sided colter having its under surface plane and its upper surface sloping downward and backward from a central ridge, and its laterally extending wings rounded at the rear and converging to a point in front, whereby the said neck alone will cut the surface of the soil. The neck thus forms a narrow furrow for receiving the grain, which is dropped immediately behind it, while the wings of the colter loosen the soil on both sides of the furrow and allow the same to be thrust along their rearward slopes and escape around the angles of the neck to cover the grain. This improved tooth and colter may be used to great advantage, not only in stubble land and sod, but for drilling grain in timothy and clover lands when the latter have become partially barren.

Rails.—Mr. Benjamin F. Sanders, of Boston, Mass, has patented an improved compound railroad rail, whereby stability is promoted and the repairing of railroad rails is facilitated. This rail consists of a cap bar and two side or base bars, arranged so that the joint of each bar will always be opposite two solid bars. The head of the cap bar sits down flat on the tops of the side bars, which latter are made with flanges upon the inner sides of their upper parts. These flanges, between which the stem of the cap bar passes, are bevelled on their under sides, and the under side of the stem of the cap bar has outer flanges similarly bevelled, whereby a dovetailed connection is formed between the three bars of the rail. The bases of the side bars, which have outer flanges that receive the spikes to fasten the rails to the ties, are so formed that the bodies of said bars incline inward. This construction, in concert with the dovetailed connection of the three bars, causes the side bars to draw down the cap bar to a firm bearing when weight is applied to the top of the rail. An anchorieg plate, extending below the side bars, and having upper lugs which lap over inner flanges on the bases of the side bars, also serve to draw the upper parts of said bars inward, keys passing through the anchoring plate for the purpose. Plates are used in connection with these keys to restrain the bases of the side bars from spreading, and a stop bar is arranged between the side bars and made to engage with said bars and the cap bar, for the purpose of holding the latter bar from longitudinal movement.

In the *manufacture of turpentine* the crude article containing chips, bark, twigs, and other foreign substances, is introduced directly into the still, and in the process of distillation the extractive colouring matter of these substances discolours the residual rosin, thereby depreciating its commercial value. Much time and labour are also spent in dipping or straining the chips, &c., from the liquid rosin, and the fire risks are greatly enhanced by the taking fire of the hot saturated chips as they are removed from the still, most of the conflagrations of turpentine stills originating from this cause. Mr. Allen Garner, of Americus, Miss., has patented an apparatus for the manufacture of turpentine and rosin which will avoid these difficulties, and will economise time and labour and lessen the costs and risks in distilling turpentine, and will produce a cleaner and more valuable rosin.

A *tire setter and cooler*, patented by Mr. William Whitmore, of Defiance, O., wherein the invention relates to improvements in that class of tire setters and coolers in which a table carrying a wheel is raised and lowered in a tank containing water to cool and set the tire. In this device the centre post ordinarily employed is dispensed with, and the operator is readily enabled by means of a lever to immerse the table and wheel in the tank and hold it in any desired position.

The *washing machine* Mr. Melville J. Fenwick, of Cottage Grove, Oreg., has patented is provided with a rubbing cylinder attached to the lower ends of two connected rocking arms loosely mounted on a shaft of the machine, which arms also carry at their lower end an additional rubbing block, on which the clothes are held by a clamp bar provided with two arms fitting in sockets containing springs for pressing the clamping bar on the block.

Elevators.—Mr. Henry R. Dulany, of Alexandria, La., has patented a suction device for elevating sand, or for elevating sugar, mortar, or similar substances from large vats, holes, or tanks. The invention consists principally of a large inverted bucket provided with a piston head, the vessel being provided at the top with suitable air-valves, the piston rod passing through the centre of the top of the vessel, and being provided with notches adapted to engage with a spring-actuated clutch for holding the piston head when forced up by the material to be raised.

A *buggy top*, of simple construction, light, durable, folded and raised conveniently, has been patented by Mr. James H. Howe, of Conneaut, Ohio. The buggy top is formed of a simple bow, to which front and rear sliding arms are pivoted at the ends of the bow, which arms are braced by hinged or jointed braces pivoted to the bow and to the sliding side arms, the braces having a short rod pivoted to them at the joint for operating them.

Beam calipers, with devices for automatically registering or indicating variations in the size of work to which they are applied, so that small differences in size can be readily detected, have been patented by Mr. George K. Webb, of Thomaston, Conn. In filing, grinding, or turning, the amount removed and to be removed can be quickly and exactly shown by means of this tool. The invention consists in a slide and indicating lever combined with one moving jaw of the calipers.

Spinning machines have been patented by Mr. Philip Townson, of Thomsonville, Conn. The object of this invention is to automatically change the speed of spindles when the bobbins are about two-thirds filled, and also to facilitate the stopping of the spindles when the flyers have been stopped.

Pump.—Mr. Abraham Van Trump, of West Elkton, Ohio, has patented an improved pump. This invention relates to a pump which is more particularly intended to be attached to a water-tank or box mounted on wheels, so as to be carried from place to place to obtain its supply of water. The invention consists in a novel arrangement of the cylinder, piston, valves, a hose, and a double screen, for guarding against the entrance of foreign substances into the pump cylinder.

A *tool for bending railroad rails*, patented by Mr. Robert Fagan, of Hazleton, Pa., consists of a bar of iron of suitable size carrying a screw at one end, the bar being adapted to be yoked to the rail in such manner that the portion of the bar beyond the yoke will form the short arm of a lever, the end through which the screw passes being the long arm of the lever. The end of the screw, when the device is attached to the rail, rests upon the rail for operating the lever and bending the rail.

In *swivel racks for looms*, patented by Mr. Buckley Weston, of Paterson, N.J., the invention consists in the combination, with the rack-bar, swivel-shuttle, and pick-bar, of pins hung on wires attached to the rack-bar and provided with lugs designed to drop in recesses near the extremities of the pick-bar, the pins being actuated by springs, so that they engage in holes formed in the shuttle.

A *saw filer*, which secures the accurate gauging of the depth of the saw teeth, the equal action of the file on the saw teeth throughout the whole length of the file, the automatic feeding of the file, and its adjustment for any desired angle or pitch of teeth, has been patented by Mr. William H. Shuttle, of Emporia, Kan. The invention consists of a sliding carriage carrying a spring-and-pawl-actuated bent arm that serves as a gauge for the depth of the saw-teeth, and at the same time to support the file frame. An adjustable clamp is secured on the bent arm for the direct support of the file frame, and so constructed that the direction of the frame and file can be changed vertically.

A window reflector or mirror, which is readily adjustable in its inclination to the window and in its inclination to the vertical plane, to provide for exhibiting objects at a greater or less distance and at different heights from the ground, has been patentod by Mr. Andrew G. Moodhe, of Stillwater, Minn. The invention consists in a window reflector composed of two mirrors, each pivoted at the middle of the adjoining ends to a plate in which a small shaft is loosely mounted, having a hand wheel on one end and a pinion at the other end, which pinion engages with two curved racks pivoted to the inner sides of the mirror, whereby the inclination or angle of these two mirrors will be varried by rotating the pinion. The lower ends of the mirrors are connected by small wires with a transverse strip pivoted to the lower end of the plate to which the mirrors are pivoted, and provided with a small shaft with a hand wheel at the end for changing the vertical inclination of the mirrors.

Boots and Shoes.—Mr. Jacob R. Scott, of Nyack, N.Y., has patented an improvement in machines for sewing boots and shoes, which supplies a desired need in a very simple manner. This invention relates to sewing machines for sewing boots and shoes, or materials varying in thickness, and its object is to obtain a variable stroke of the needle regulated by the movement of the presser bar, according to the thickness of material being sewed. The invention consists in a cam sleeve fitted for movement by a cam on the presser bar, and arranged to raise the fulcrum post of the needle bar as the presser bar is raised, so that the presser bar being positioned by the thickness of the material, the fulcrum post of the needle is correspondingly positioned.

Invalid bedsteads, which provide for the more convenient adjustment of the pivoted head, back, and leg or foot rests of the bed, and for the use of suitable vessels with its mattress for the relief of the patient, have been patented by Mr. George B. Davis, of Richmond, Va. This invention consists in a combination with a pivoted head and back rest, of one or more springs for holding said rest in an inclined position when the patient is resting thereon, and a strap passing over a pulley or roller and secured by a buckle, for compressing said spring to vary the inclination of the rest and to hold it in any desired position. The foot rest of the bed is also pivoted, and may be raised or lowered and held by a strap. The invention also consists in the combination with the mattress having a hole in it for the use of a suitable utensil below it, of a cushion or pad closing said hole, and levers for supporting the pad when closing the hole, and providing for its removal out of the way when necessary to expose said hole.

Stamp punches.—Mr. Henry H. Norrington, of West Bay City, Mich., has patented an improvement in the class of punches or perforating stamps designed for use in banking and other similar establishments for the purpose of puncturing or cutting out portions of a check or other written instrument, and thereby preventing fraud by alteration of such instrument to cause it to express a higher value than was originally intended.

Ditching machine.—Mr. Samuel C. Robinson, of Pemberton, O., has patented a ditching machine which is an improvement on a ditching machine for which Letters Patent were granted to the same inventor June 28, 1881, No. 243,624; and it consists, first, in entirely inclosing both sides of the ditching wheel with suitable plates, to prevent the ingress of dirt into the wheel, and dishing said plates from the rim of the ditching wheel to its centre, whereby the thickness of the ditching wheel is greatest at its rim, and the side plates will not interfere with the sides of the ditch in excavating it.

Car brakes.—Mr. William A. Roberts, of Battle Creek, Mich., has lately patented an improvement in car brakes, which consists in a lever pivoted to the bottom of the end of the car, and having its lower end connected with the brake draw rods by a chain passing over a pulley pivoted in a bracket arm on the bottom of the car, so that when this lever is thrown the chain will be drawn outward and draw the brake up tight.

Rail fences, which admit of fence being laid in a straight line, and effect a great saving in labour and fence material, have been patented by Mr. Leonard J. Murphy, of Wauseon, Ohio. This improvement consists in a combination with the post and rails of a fence of a rectangular frame composed of vertical side bars and horizontal bars secured at their ends to the side bars, and at the centre of their length to the post, whereby spaces are formed on each side of the post for the reception of the rails, which need not be secured.

Knitting machines.—Mr. James Denton, of Amsterdam, N.Y., has patented an improved attachment for knitting machines. The improvement is designed to provide for making knit fabrics with horizontal, vertical, or diagonal stripes, or other patterns of one or more colours, without breaking the thread whenever the colour is to be changed. The machine to which the attachment is to be applied has the usual barbed knitting needles, and a sinker and a presser wheel operating in combination with needles. It also has a thread guide, through which duplicate threads pass, attached to the bearing of the presser wheel. The attachment, which operates in concert with these devices, has a vibrating looped lever for guiding one of the threads and for exposing it on the outside of the fabric, a supplemental lever connected to the looped lever, a reciprocating adjustable cam which is removably secured to the supplemental lever, and a pair of wheels, operated one by the other, and provided with detachable laterally projecting pins for giving a reciprocating movement to the cam and vibratory movements to the levers, for the purpose of making stripes and other patterns, the number of detachable pins employed regulating the exposure of the thread carried by the looped lever in the pattern. For making different patterns, various changes require to be made, and numerous other details enter into the combination.

Bed attachment for invalids, by which bedridden persons may be easily and comfortably attended, has been patented by Mr. Joshua P. Brown, of Crockett, Tex. This invention consists principally of a frame pivoted between the side boards of a bedstead, and which is provided with a removable seat, the same being adapted to be brought into a vertical position for supporting the invalid in a sitting posture. The head-piece and side-arms of this frame have secured to them a supporting strip of canvas, which is fastened at its bottom to a sheet of like material that is firmly secured at its front end to the head-board of the bedstead, and passes at its opposite end over a roller, by which it may be slackened, or be stretched and held taut, accordingly as it is desired to adjust the invalid into a sitting or a recumbent position. These two canvas attachments, which form the back of the frame, constitute the bed bottom, on which the mattress may be placed. The removable seat consists mainly of an upper board having an opening in it which may be covered by a pivoted cushion, a bottom board provided with means for holding a utensil, and flexible or hinged connections between said boards. This seat is supported by the side arms of the pivoted frame, and constructed to engage with hooked hinged arms which serve to retain the seat in position between the side arms of the frame, and so form an easy and secure support for the patient.

Cars for conveying Animals. — Messrs. John M. Edmunds and Charles E. Wallin, of Salt Lake City, U.T., have patented a practicable and humane improvement in stock cars. This invention relates to means for holding up or supporting live stock during transportation by car, and consists in belts of leather or strong webbing attached to rollers arranged at the ends or the car, and passing over cross-bars in the car, and through stirrups suspended from the roof, at such a height from the floor of the car as that said belts, when drawn taut by turning the rollers, will pass directly under the bellies of the animals, and so support and relieve the latter.

A wire stretcher for stretching the wires of wire fences, and which operates without injury to the wire, has been patented by Mr. Spencer W. Johnson, of Lathro, Mo. In this device two plates hinged together at their one end, and provided with transverse grooves on their faces, in which the wires are placed, are drawn together by a clamping screw to hold the wire firmly between them. These groves, which are coincident in the faces of the plates, are not made in a direct line across said faces, but are enlarged or rounded near the edges of the plates to form curved shoulders, over or against which the wire to be stretched is drawn, and whereby the wire will not be cut, bent short, or otherwise injured. The device is applicable to stretching either plain or barbed wire, and the power employed for stretching the wire may be transmitted through a lever passed through a ring attached to the device, or it may be otherwise applied.

Hay elevator.—Mr. Daniell Dockstader, of Fenda, N.Y., has patented an improved hay elevator. The carrier frame of this elevator is held in position, ready for loading the latter, by a catch pivoted to the underside of the track on which said frame moves, and such frame is fitted internally with a vertically sliding block, a catch, a notched dog with which the catch engages, and a sheave over which the free portion of the elevator rope or chain that carries the lifting pulley block passes, the fast end of said crain being attached to the carrier frame. These devices are arranged so that when it is desired to raise and move the loaded hay fork attached to the pulley block, by first pulling on the elevator chain or rope, the pulley block strikes and raises the sliding block, which releases the catch from the dog in the carrier frame, and also releases the track catch from the latter, and the dog when liberated engages with elevator chain to keep it from running back. The carrier frame with its attached load is then free to be moved as required. After the load is removed the carrier frame is moved back again for another load, and the sliding block, dog, and catches automatically resume their normal position. The action is a very perfect one.

Sash balance.—Mr. John A. Quick, of Palestine, Texas, has patented a spring tensioned sash balance by which the top sash may be held in close contact with the top of the window frame or adjusted at a lowered position without hoisting the bottom sash.

A *cuff or collar* fastening has been patented by Mr. Mahlon Loomis, of Lynchburg, Va. This invention consists in a strip of metal bent at each end in opposite directions to form spring hooks, having the inner surfaces roughened or serrated and the curved portions corrugated.

A *nose feed bag* for animals has been patented by Mr. Charles J. Gustaveson, of Salt Lake City, Utah Ter. This nose bag has a supporter having two or more cross stays on the lower end for protecting the perforated bottom. The latter is made removable so that the device may be used as a muzzle.

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